USER MANUAL
VIBRATION CONTROL
RMA - Feeder Controller 105

IMPORTANT NOTES

Electrical danger **within the meaning of this documentation or the warning labels on the product itself respectively means that death, serious injury or considerable material damage may occur if the respective measures of precaution are not taken.**

Mechanical danger **within the meaning of this documentation or the warning labels on the product itself respectively means that death, serious injury or considerable material damage may occur if the respective measures of precaution are not taken.**

Disconnecting voltaged parts **within the meaning of this documentation means that before maintenance, repair and installation work, the voltage must be switched off and secured against being switched on again.**

Qualified Staff

According to this user manual and the labels on the product itself, qualified staff includes those persons, who are familiar with the installation, mounting, initial operation and operation of the device as well as the dangers associated with this and who have the qualifications necessary for their work, such as:

1. **Training or instruction or authorisation respectively to switch electric circuits and devices on and off, ground and mark them according to the standards of safety engineering.**
2. **Training and instruction according to the standards of safety engineering concerning the care and use of adequate safety equipment.**
3. **First aid training**

Intended Use

The RMA-Feeder Controller 105 must only be used for the control of our KÖBRATOR – oscillating rails and for the processing of digital and analog signals.

Warranty

Adherence to the user manual is the pre-condition for a failure-free operation and for the settlement of possible claims under the warranty. Therefore, please study the user manual before you operate the device.

Disposal

Dispose of the RMA-Feeder Controller 105 depending on composition and existing regulations as:

-steel scraps
-aluminium
-copper
-synthetic material
-electronic scraps

Index

IMPORTANT NOTES 2
Index 4

1. Safety Instructions *5*

2. Installation *6*

2.1 Electrical Installation **6**

2.2 Connection Diagram (Example) **7**

3. Technical Data *8*

3.1 Electric power supply **8**

3.2 Digital-Inputs voltage-separated **8**

3.3 Functional Inputs voltage-connected **9**

3.4 Digital-Outputs voltage-separated **10**

3.5 Digital-Inputs voltage-separated to the system **11**

3.6 Digital-Outputs voltage-separated to the system **12**

3.7 4Q-Output transformer voltage-separated to the system **13**

3.8 Analog-Inputs voltage connected **14**

3.9 CAN voltage-separated **15**

3.10 RS232 voltage-connected **16**

3.11 RS485 voltage-connected **16**

4. Displays and Control Keys *17*

4.1 Automatic Operation **17**

4.2 Setup Operation **17**

4.3 Deletion of Malfunctions **17**

4.4 Setting of the Vibration **18**

4.5 Status – Display of the I-Os **18**

4.6 Saving the Frequency or the Performance Settings Respectively. **18**

4.7 Set up values of Pneumasort times **19**

5. Troubleshooting *20*

5.1 Error list **21**

1. Safety Instructions

The RMA-FEEDER CONTROLLER 105 controls oscillating mechanical parts (KÖBRATOR), which may be dangerous.

Safety measures and safety devices must correspond with the valid national regulations (e.g. VDE 0100 T410 /VDE 0113 T1 or EN 60204 / VDE 0160 respectively)
Necessary safety measure: grounding of the RMA-Feeder Controller 105
Necessary safety device: circuit breaker

If you do not wish to install the device immediately, but instead wish to store it:
The storage place must be dry and clean;
the storage temperature must be between –25°C and +85°C.

Check the device immediately for damaged packaging. Send complaints concerning damages immediately.
See to it that damaged products are not operated!

The connection, initial operation, as well as maintenance and repair work must only be executed by qualified expert staff, taking into consideration this manual and all other connection diagrams belonging to the RMA-FEEDER CONTROLLER 105 and the presently valid national /international regulations (safety / accident prevention)

The RMA-Feeder Control 105 is built for 24V DC operation.

We reserve the right to change technical data and constructions beneficial to technical progress.

2. Installation

2.1 Electrical Installation

Please be sure to note the safety instructions in Chapter 1 during the electrical installation!

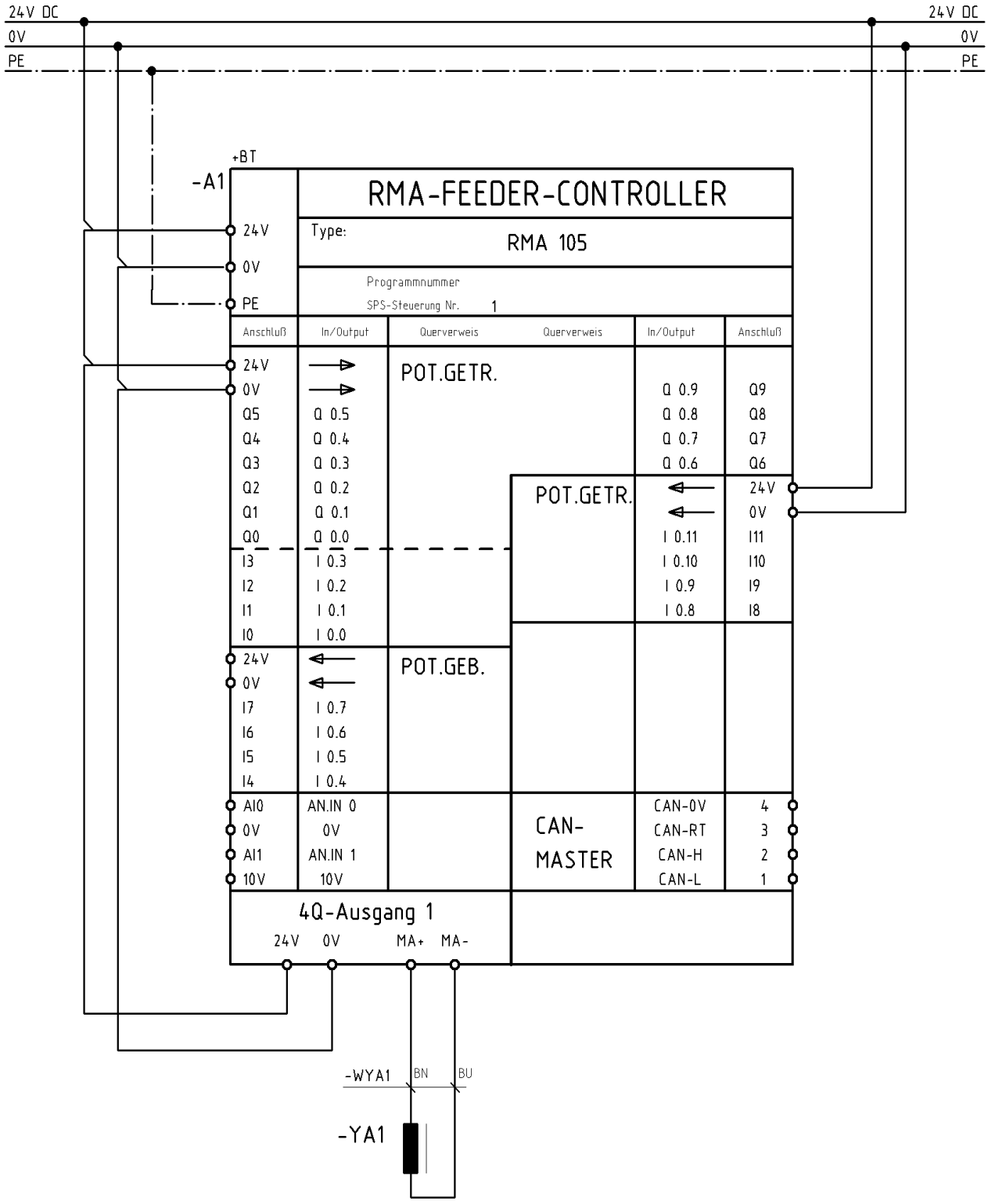
THE DEVICE MUST BE GROUNDED.

Please be sure to note the safety instructions in Chapter 1 during the electrical installation!

As a connecting line for the KÖBRATOR only the supplied cable must be used. Only one Köbrator may be operated for each magnetic output of the Feeder Controller.

Connect all electric connections according to the connection diagram

2.2 *Connection Diagram (Example)*



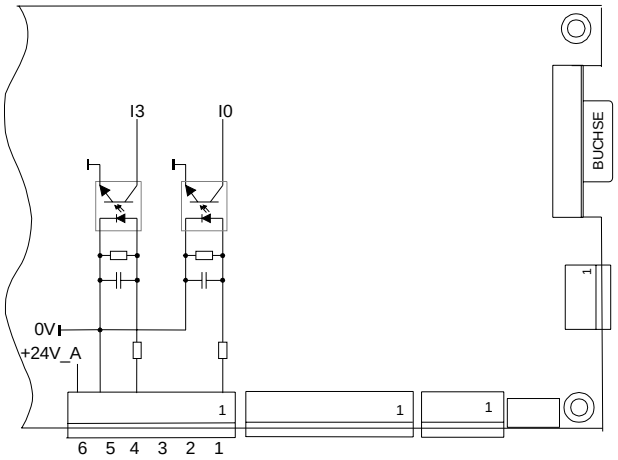
3. Technical Data

3.1 Electric power supply

Input voltage	
Nominal value	24 V DC
admissible range	+/- 25 % incl. 10 % residual ripple
Drawing of current from 24 V	≤ 0.6 A

3.2 Digital-Inputs *voltage-separated*

Number	4
Input voltage	
Nominal value	24 V
admissible range	- 30 ... + 30 V
Fan-in current at	
HIGH - level	6.1 mA
Propagation delay time	
$t_{LOW - HIGH}$	3.5 ms
$t_{HIGH - LOW}$	2.8 ms
Input voltage	
LOW - level	≤ 5 V
HIGH - level	≥ 15 V
Mechanical driving point impedance	3.9 kΩ

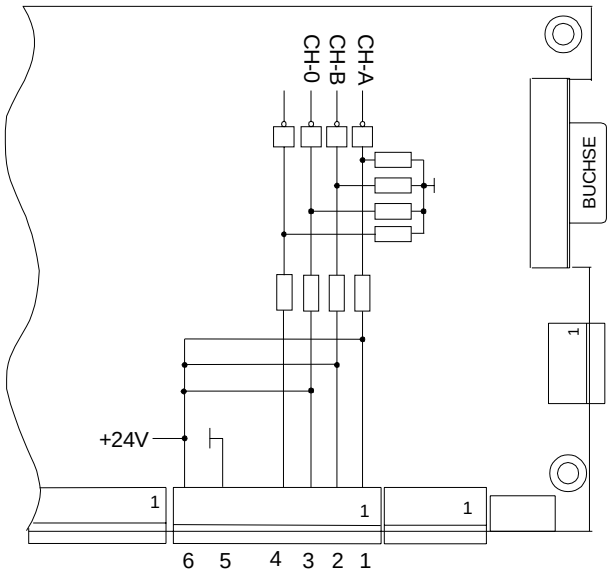


Actuator supply

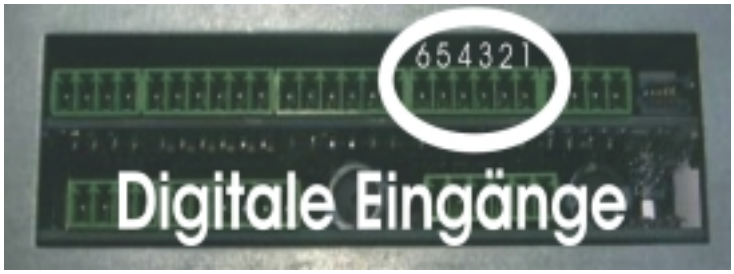
Pin:	Inputs
1	I 0
2	I 1
3	I 2
4	I 3
5	0 V
6	+ 24V_A

3.3 Functional Inputs *voltage-connected*

Number	4, usable as
Standard Inputs	4
Incremental supply input	1
Timer- / counter inputs	4
Input voltage	
Nominal value	24 V
admissible range	- 30 ... + 30 V
Fan-in current at	
HIGH - level	5.2 mA
Input frequency	
at duty cycle 0.5	⌠ 25 kHz
Propagation delay time	
Standard inputs	
$t_{LOW - HIGH}$	15 µs
$t_{HIGH - LOW}$	15 µs
Input voltage	
LOW - level	⌠ 5 V
HIGH - level	∫ 15 V
Selector shaft	
$U_{LOW - HIGH}$	13.1 V
$U_{HIGH - LOW}$	9.5 V
Mechanical driving point impedance	4.6 kΩ
Input signals VRZ	2-Phase-square moved by 90° 1 reset pulse
Gating	4 - fold
Sensor supply	24 V DC, +/-25 %, 150 mA

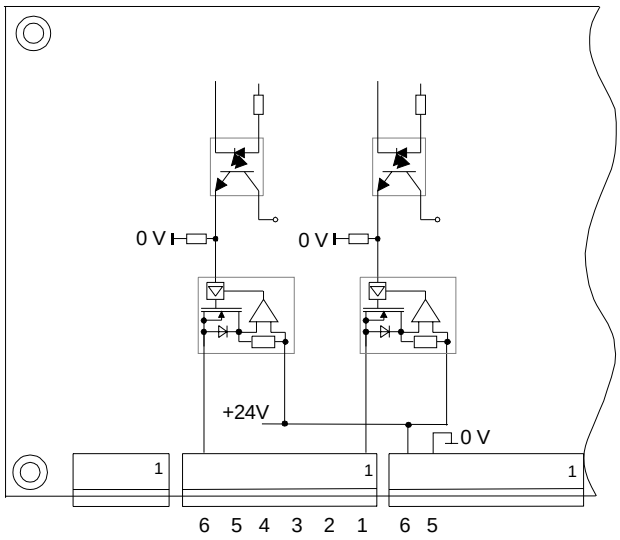


Pin:	Dig. In	Fun.-In	VRZ
1	I 4	IN 0	CH-A
2	I 5	IN 1	CH-B
3	I 6	IN 2	CH-0
4	I 7	IN 3	
5	GND		
6	+ 24 V		



3.4 Digital-Outputs *voltage-separated*

Number	6
On-load voltage Vin	
Nominal value	24 V
admissible range	18 ... 30 V
Output voltage	
HIGH - level	min. Vin-0,2 V
LOW - level	max. 2 µA · RL
Fan-out current	max. 500 mA
Parallel connection of outputs	possible, max. 4 outputs with Itotal = 2 A
Short circuit-proof	yes, thermal overload protection
Sampling frequency	
ohmic load	100 Hz
inductive load	2 Hz (induction-dependent)
Lamp load	max. 6 W
simultaneity factor	100 %



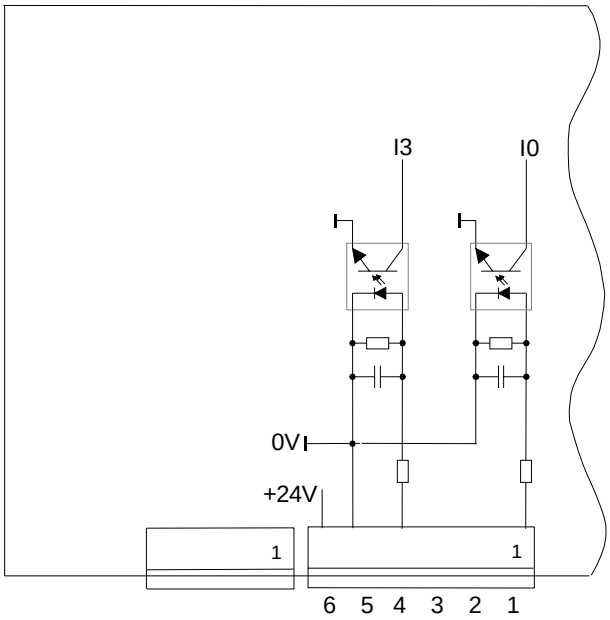
Pin:	Outputs
1	Q 0
2	Q 1
3	Q 2
4	Q 3
5	Q 4
6	Q 5

⚠ WARNING:
Voltage negative feed at the outputs can lead to the destruction of the output drivers.

3.5 Digital-Inputs *voltage-separated to the system*

and to 4Q-output transformers

Number	4
Input voltage	
Nominal value	24 V
admissible range	- 30 ... + 30 V
Fan-in current at	
HIGH - level	6.1 mA
Propagation delay time	
$t_{LOW - HIGH}$	3.5 ms
$t_{HIGH - LOW}$	2.8 ms
Input voltage	
LOW - level	≤ 5 V
HIGH - level	≥ 15 V
Mechanical driving point impedance	3.9 kΩ
Actuator supply	
Nominal value	24 V
admissible range	18 ... 30V

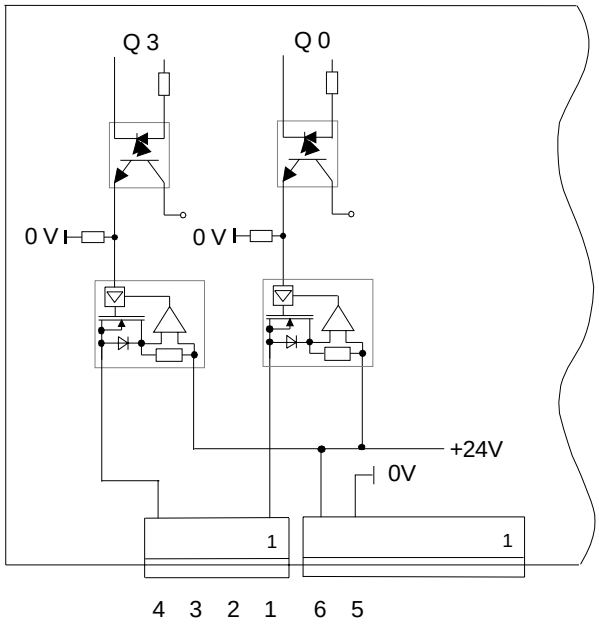


Pin:	Inputs
1	I 8
2	I 9
3	I 10
4	I 11
5	0 V
6	+ 24 V

3.6 Digital-Outputs *voltage-separated to the system*

and to 4Q-output transformers

Number	4 (1 group à 4)
On-load voltage Vin	
Nominal value	24 V
admissible range	18 ... 30 V
Output voltage	
HIGH - level	min. Vin-0.2 V
LOW - level	max. 2 µA · RL
Fan-out current	max. 500 mA
parallel connection of outputs	possible, max. 4 outputs with Itotal = 2 A
Short circuit-proof	yes, thermal overload protection
Sampling frequency	
ohmic load	100 Hz
inductive load	2 Hz (induction-dependant)
Lamp load	max. 6 W
Simultaneity factor	100 %



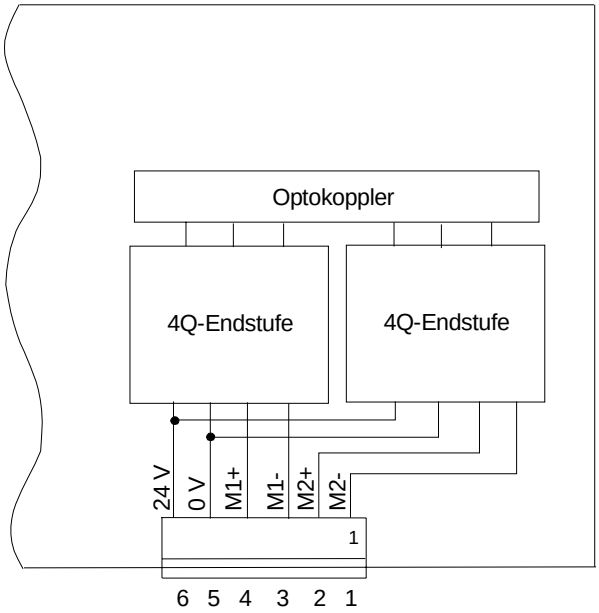
Pin:	Outputs
1	Q 6
2	Q 7
3	Q 8
4	Q 9

Pin:	Outputs
5	0 V
6	+ 24 V

3.7 4Q-Output transformer voltage-separated to the system

and to Digital IO's

Number	2
Voltage supply on-load voltage Vin	
nominal value	24 V
admissible range	18 ... 30 V
Monitoring of voltage	yes
undervoltage	3.5 V ... 7 V
overvoltage	33 V ... 43 V
Drawing of current from 24 V	
per output	on-load current + 0.02A
Output voltage (ohmic load)	
	typ. voltage Vin - (0.125 Ohm * I_{load})
min. voltage	Vin - (0.300 Ohm * I_{load})
Fan-out current	
constant current	min. 2.5 A
pulse current 1 second	typ. 4.4A
Short circuit-proof	yes, thermal overload protection
Sampling frequency outputs	per PWM ca. 20 kHz für Motoren (Var -06) per PWM approx. 0.5 ... 600 Hz for magnetic valve, vibration



Pin:	4Q Output (2 channels, -06)
1	M2-
2	M2+
3	M1-
4	M1+
5	0V (4Q)
6	+24V (4Q)

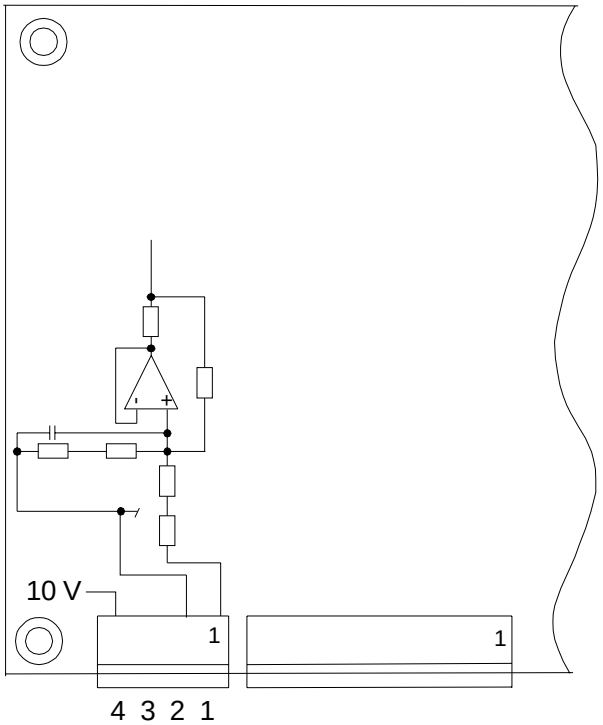
WARNING:
Voltage negative feed at the outputs can lead to the destruction of the output drivers.

3.8 Analog-Inputs voltage connected

Number of channels	2
Input quantity	0 ... 10 V
AD-transformation	via ADC to CPU
Approximation	transformation principle successive
	Resolution 10 Bit
	transformation duration 20 µs
Max. Input range	
	voltage range +/- 20 V
Mechanical driving point impedance	
	voltage range 136 kΩ
Offset malfunction (0-point)	
	voltage range ≤ +/- 100 mV
	amplification malfunction ≤ +/- 1.0 %
Connecting line	shielded
	length max. 50 m

For type –10 is valid:
Offset malfunction (0-point)

voltage range ≤ +/- 100 mV



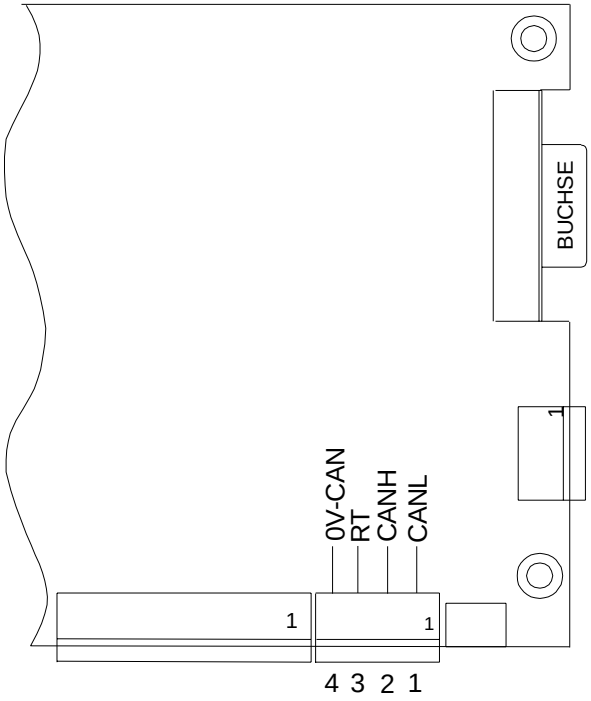
Pin:	Analog-Input
1	AI 0
2	GND
3	AI 1
4	+ 10V

⚠ WARNING:
Voltage negative feed at the outputs can lead to the destruction of the output drivers.

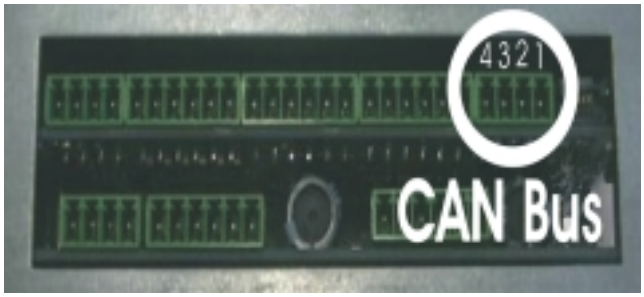
3.9 CAN

voltage-separated

	min.	max.
Output differential voltage	+ 1.5 V	+ 3 V
Input differential voltage		
recessive	- 1 V	+ 0.4 V
dominant	+ 1 V	+ 5 V
Input-Offset voltage (to CAN-GND)		+/- 6 V
Input differential resistance	20 kΩ	100 kΩ
Transmission rate		
up to 15 m cable length	max. 1 MBit	
up to 50 m cable length	max. 500 kBit	
up to 150 m cable length	max. 250 kBit	
up to 350 m cable length	max. 125 kBit	
Number participants	max. 64	
Connecting line	shielded, twisted	
up to 100 m	0.25 mm²	
up to 350 m	0.5 mm²	



Pin:	CAN
1	CANL
2	CANH
3	RT
4	0V-CAN

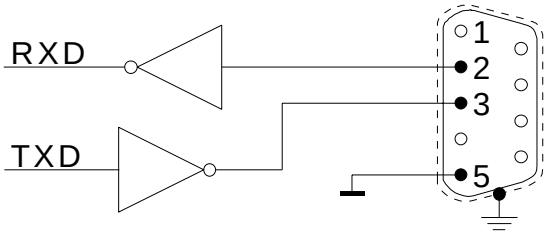


Terminals: by connection of RT via a bridge
to CANH at the ends of the CAN-network.

3.10 RS232

voltage-connected

	min.	typ.	max.
Output voltage	+/- 3 V	+/- 8 V	+/- 15 V
Input voltage	+/- 3 V	+/- 8 V	+/- 30 V
Fan-out current			+/- 10 mA
Input resistance	3 kΩ	5 kΩ	7 kΩ
Transmission rate	1200 ... 57600 Bd		
Connecting line	shielded, min. 0.14 mm²		
up to 9600 Bd	max. 15 m		
up to 57600 Bd	max. 3 m		

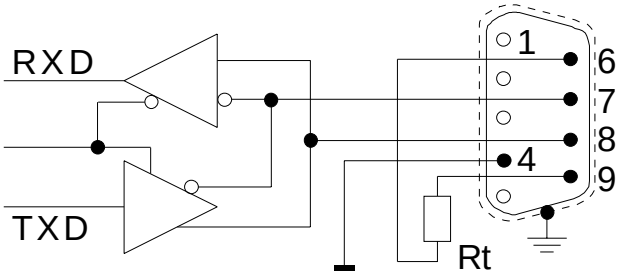


Pin:	RS 232
1	Service-Pin
2	RXD
3	TXD
5	GND

3.11 RS485

voltage-connected

	min.	max.
Output differential voltage	+/- 1.5 V	+/- 5 V
Input differential voltage	+/- 0.5 V	+/- 5 V
Input offset voltage (to GND)		- 6 V/+ 6 V
Fan-out driver current (U_{diff} = +/- 1,5 V)		+/- 55 mA
Transmission rate	1200 ... 57600 Bd	
Connecting line	shielded	
at 0.14 mm²	max. 300 m	
at 0.25 mm²	max. 600 m	



Pin:	RS 485
1	Service-Pin
4	(GND)
6	Rt-
7	RTX-
8	RTX+
9	Rt+

Terminal: by connection of Rt via bridges of 6-7 and 8-9 and the end of the RS 485 network.

NOTE:
All Service-Pins are intended for use by the factory and must not be connected by the user.

4. Displays and Control Keys

4.1 Automatic Operation

The automatic operation is a mode of operation during which all movements, functions of the machine are executed by the control.
By pressing the key **** AUTO - MAN **** you can switch between **** Automatik **** (autmatic) and **** Einrichten **** (setup).
In the automatic operation, the message **** Automatik vorgewählt **** (automatic preset) appears in the display.
All current malfunctions and messages appear on the display.
With the **** F **** keys shown in the display again different functions can be executed, e.g. starting the automatic operation, stopping the automatic operation. You can receive further information from the display.

4.2 Setup Operation

The setup operation is a mode of operation during which all movements, functions of the machine can be executed selectively by hand.
By pressing the key **** AUTO - MAN **** you can switch between **** Automatik **** (autmatic) and **** Einrichten **** (setup).
In the setup menu, the sub-menus ****FUNKTIONEN**** (functions) will appear for the start of individual functions and the sub-menu **** SERVICE **** . They are selected with the *** ↓*** and *** ↑*** keys .
With the **** ENTER **** key the selected sub-menu is invoked.
In the sub-menu ****FUNKTION**** the individual functions, movements of the machine can be selected with the *** ↓ *** and *** ↑*** keys and can be invoked with the *** ← *** und *** →*** keys shown in the display. Movements leading to collision are blocked.
The sub-menu **** SERVICE **** is only accessible for authorized maintenance personnel and therefore protected by a password. In this menu, the individual times can be changed or the language switched. With a separate password, the frequency for the vibration range can be set.
With the * ***ESC*** * key, the individual menus can be left again.

4.3 Deletion of Malfunctions

The malfunction is defined in the display if its existence makes it impossible for the set mode of operation to be executed.
By pressing the **** RESET **** key, the malfunction is deleted.

4.4 Setting of the Vibration

By pressing the ***** ***VIBRATION*** ***** key, the display shows the function ***** **Einstellen der Vibration** ***** (setting of the vibration). By pressing the ***** ***VIBRATION*** ***** key again, the function can be left.
In the menu ***** ***VIBRATION*** ***** the performance of the vibration range can be changed with the ***** ↓ ***** und ***** ↑***** keys**.** When leaving the menu, the thus set performance is not secured against a voltage loss.
(Saving of performance settings see Chapter 4.6)

4.5 Status – Display of the I-Os

By pressing the ***** ***Info*** ***** key, the display shows the stated special function. By pressing the ***** ***Info*** ***** key again, the special function can be left.
In the special menu ***** ***INFO*****,** the status of the input and output bytes is shown.
By pressing the ***** ↓ ***** and ***** ↑***** keys, you can switch between the **Byte 0** and the **Byte 1.**
However, this function is intended for the control of the inputs and outputs of the Feeder Controllers .

4.6 Saving the Frequency or the Performance Settings Respectively.

In order to secure the frequency or the performance respectively against a voltage loss, the value must be saved by pressing the ***** ← ***** , ***** →***** and ***** ***ENTER*** ***** keys at the same time.
However, make sure that the ***** ***ENTER*** ***** key is pressed last..

Therefore your set values are overwritten !!!

4.7 Set up values of Pneumasort times

Deutsch	Englisch	Schwedisch	Französisch	Meaning
Ruheschaltung Pneu	Pneu off when empty	Viloläge pneu	position repos Pneu	**Off position Pneumasort:** Pneumasort switches off when all switches are idle time x
Teilemangel	parts deficiency	delbrist	manque pièces	**Part deficiency** time X for no parts in the funnel
NIV Bunker min	lev storage belt min	niv lagring min	remplissage mini	**Level storage belt not reached** switch in funnel is idle time X
NIV Bunker max	lev storage belt max	niv lagring max	remplissage maxi	**Level storage belt exceeded:** switch in funnel is busy time X
NIV Sortier. min	lev track max	niv band min	rail de triage mini	**Level sorting rail not reached:** switch on vibrating rail is idle time X
NIV Sortier. max	lev track max	niv band max	rail de triage maxi	**Level sorting rail exceeded:** switch on vibrating rail is busy time X
TKE Sort 1 min	pk end of track min	slut band 1 min	rail de triage 1 mini	**Parts control end of sorting rail not reached:** switch at the end of the vibrating rail is idle time X
TKE Sort 1 max	pk end of track max	slut band 1 max	rail de triage 1 maxi	**Parts control end of sorting rail exceeded:** switch at the end of the vibrating rail is busy time X

5. Troubleshooting

The chapter Troubleshooting covers only the componentry RMA-Feeder Controller 105 in connection with a KÖBRATOR.

Troubleshooting only by qualified staff!

Troubleshooting only by qualified staff!

BE SURE to disconnect the voltage of the RMA-Feeder Controller 105 before opening the cover.

5.1 Error list

Malfunction	***Cause***	***Solution***
There is supply voltage, but there is no display	Microprocessor not described	Software-download only by qualified staff. Upon request you can receive this download-file from the service technicians in our company in the automatisation department.
The output **MAGNET** is selected, however, no vibration can be determined in the KÖBRATOR	KÖBRATOR is jammed mechanically **or** Distance between yoke and magnet in the KÖBRATOR has changed	Turn off device and determine whether KÖBRATOR is jammed Please contact the service technicians in our company in the manufacturing department “Elektro” in order to find out the set interval between the yoke and the magnet.
The output **MAGNET** is selected, however, no vibration can be determined in the KÖBRATOR	Electric connection between KÖBRATOR and RMA 105 is interrupted **or** Magnet in the KÖBRATOR defect	Control plug-in connection on the back of the KÖBRATOR. Determine resistance of the magnet in the KÖBRATOR, possibly replace magnet. (Please consult the KÖBRATOR maintenance manual and spare parts list for the resistor of the magnet)